IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original): A contaminated solid material clarification method for removing heavy metals from a contaminated solid material containing the heavy metals, comprising:

performing a dissolution step and a separation step in parallel in an identical container, the dissolution step being a step of dissolving heavy metal ions from the solid contaminated material, and the separation step being a step of separating the dissolved heavy metal ions from the contaminated solid material and interstitial water; and

maintaining the contaminated solid material in a condition of a reducing atmosphere and a strongly acidic or strongly alkaline atmosphere until dissolution and separation of the heavy metal ions are completed.

Claim 2 (Original): The method according to claim 1, characterized in that the reducing atmosphere is provided by rendering a cathode potential -0.16V or lower with respect to a hydrogen standard electrode potential.

Claim 3 (Original): The method according to claim 1, characterized in that the reducing atmosphere is provided by rendering a cathode potential -0.25V or lower with respect to a hydrogen standard electrode potential.

Claim 4 (Original): The method according to claim 1, characterized in that the reducing atmosphere is provided by controlling a current density from a cathode to an anode within a range of 0.01 to 10A/L of a reaction liquid.

Claim 5 (Currently Amended): The method according to claim 1 ~~any one of claims 1 to 4~~, wherein the strongly acidic atmosphere is such that a pH of the interstitial water of the contaminated solid material is 3 or lower, and the strongly alkaline atmosphere is such that the pH of the interstitial water of the contaminated solid material is 12 or higher.

Claim 6 (Currently Amended): The contaminated solid material clarification method according to claim 1 ~~any one of claims 1 to 5~~, characterized in that the step of separating the heavy metal ions includes a step of depositing the heavy metals on a cathode surface, and during the deposition step, the heavy metals are deposited on the cathode surface under conditions, under which a flow of a slurry containing at least the contaminated solid material is controlled or suppressed so as to decrease a shearing force of the slurry acting on the cathode surface so that the shearing force acting on the cathode surface does not impede deposition of the heavy metals.

Claim 7 (Original): The method according to claim 6, characterized in that decrease of the shearing force is performed by positioning a cathode upwardly in the slurry, and controlling a solid particle size distribution in the slurry such that solids of small particle diameters in the slurry are present at an upper position in the slurry, and solids of large particle diameters in the slurry are present at a lower position in the slurry.

Claim 8 (Original): The method according to claim 7, characterized in that the solid particle size distribution in the slurry is controlled by imparting an upward flow of the slurry at a controlled flow velocity.

Claim 9 (Currently Amended): The contaminated solid material clarification method according to claim 1 ~~any one of claims 1 to 8~~, characterized in that plural cathodes are arranged in the reaction vessel, and the dissolution step and the separation step are performed in parallel in the reaction vessel.

Claim 10 (Original): The contaminated solid material clarification method according to claim 9, characterized in that at least one of the plural cathodes is a cathode for dissolution mainly acting to dissolve the heavy metal ions, and at least one of the other cathodes is a cathode for deposition mainly acting to deposit the heavy metal ions.

Claim 11 (Original): The contaminated solid material clarification method according to claim 10, characterized in that the cathode for deposition is located at a position near to an anode than the cathode for dissolution.

Claim 12 (Currently Amended): The contaminated solid material clarification method according to claim 10 ~~or 11~~, characterized in that the cathode for deposition and the cathode for dissolution are controlled to electrode potentials different from each other.

Claim 13 (Currently Amended): The contaminated solid material clarification method according to claim 10 ~~any one of claims 10 to 12~~, characterized in that the cathode for deposition and the cathode for dissolution comprise substances having standard electrode potentials different from each other, and the substance having a relatively high standard electrode potential is used as the cathode for deposition, while the substance having a relatively low standard electrode potential is used as the cathode for dissolution.

Claim 14 (Currently Amended): The contaminated solid material clarification method according to claim 10 ~~any one of claims 10 to 13~~, characterized in that the cathode for deposition is composed of a substance on which the deposited heavy metals are electrodeposited more easily than a substance constituting the cathode for dissolution.

Claim 15 (Original): A contaminated solid material clarification apparatus including a reaction vessel comprising contaminated solid material supply means for supplying a contaminated solid material containing heavy metals, a cathode for providing a reducing atmosphere, a diaphragm, and an anode, and wherein

the diaphragm defines an anode zone containing the anode, and a cathode zone containing the cathode and the contaminated solid material supply means, and

the cathode zone is maintained in the reducing atmosphere and a strongly acidic or strongly alkaline atmosphere, and dissolution of heavy metal ions from the solid contaminated material, and separation of the dissolved heavy metal ions from the contaminated solid material and interstitial water are performed in parallel in the reaction vessel.

Claim 16 (Original): The contaminated solid material clarification apparatus according to claim 15, characterized in that the cathode zone of the reaction vessel is further provided with acidic substance or alkaline substance supply means for supplying an acidic substance or an alkaline substance.

Claim 17 (Currently Amended): The contaminated solid material clarification apparatus according to claim 15 ~~or 16~~, characterized in that the reaction vessel is further provided with shearing force suppressing means to decrease a shearing force exerted on a

surface of the cathode by a slurry containing at least the contaminated solid material supplied to the reaction vessel, and also maintain a state of contact between the cathode and the slurry.

Claim 18 (Original): The contaminated solid material clarification apparatus according to claim 17, characterized in that the shearing force suppressing means is slurry upward flow providing means for giving the slurry as an upward flow at a predetermined flow velocity.

Claim 19 (Original): The contaminated solid material clarification apparatus according to claim 18, characterized in that the slurry upward flow providing means includes a slurry withdrawal port provided in an upper portion in an interior of the reaction vessel, a slurry introduction port provided at a bottom of the reaction vessel, and a circulating pump for circulating the slurry from the slurry withdrawal port to the slurry introduction port, and is arranged to raise the slurry from the bottom of the reaction vessel in the reaction vessel at a desired speed.

Claim 20 (Original): The contaminated solid material clarification apparatus according to claim 17, characterized in that the shearing force suppressing means is a flow controlling mechanism for controlling a flow of the slurry so as to reduce the shearing force of the slurry flow exerted on the cathode surface, and is a flow controlling member composed of one or more materials selected from a plate material, a porous material, a honeycomb-shaped material, and a network-shaped material.

Claim 21 (Currently Amended): The contaminated solid material clarification apparatus according to claim 15 ~~any one of claims 15 to 20~~, characterized in that plural cathodes are arranged in the reaction vessel.

Claim 22 (Original): The contaminated solid material clarification apparatus according to claim 21, characterized in that at least one of the plural cathodes is a cathode for dissolution mainly acting to dissolve the heavy metal ions, and at least one of the other cathodes is a cathode for deposition mainly acting to deposit the heavy metal ions.

Claim 23 (Original): The contaminated solid material clarification apparatus according to claim 22, characterized in that the cathode for deposition is located at a position near to an anode than the cathode for dissolution.

Claim 24 (Currently Amended): The contaminated solid material clarification apparatus according to claim 22 ~~or 23~~, characterized in that the cathode for deposition and the cathode for dissolution are controlled to electrode potentials different from each other.

Claim 25 (Currently Amended): The contaminated solid material clarification apparatus according to claim 22 ~~any one of claims 22 to 24~~, characterized in that the cathode for deposition and the cathode for dissolution comprise substances having standard electrode potentials different from each other, and the substance having a relatively high standard electrode potential is used as the cathode for deposition, while the substance having a relatively low standard electrode potential is used as the cathode for dissolution.

Claim 26 (Currently Amended): The contaminated solid material clarification apparatus according to claim 22 ~~any one of claims 22 to 25~~, characterized in that the cathode for deposition is composed of a substance on which the deposited heavy metals are electrodeposited more easily than a substance constituting the cathode for dissolution.

Claim 27 (Currently Amended): The contaminated solid material clarification apparatus according to claim 15 ~~any one of claims 15 to 26~~, characterized in that the diaphragm is positioned so as to surround the anode, thereby forming the anode zone inwardly of the diaphragm and forming the cathode zone outwardly of the diaphragm.

Claim 28 (Original): The contaminated solid material clarification apparatus according to claim 27, characterized in that the diaphragm is unitized in a cylindrical, box-shaped or bag-shaped form composed of the diaphragm alone or a combination of the diaphragm and other reinforcement, and the anode is positioned within the unit.

Claim 29 (Currently Amended): The contaminated solid material clarification apparatus according to claim 27 ~~or 28~~, characterized in that the cathodes are arranged in a stellate or radial configuration so as to surround the diaphragm.

Claim 30 (Original): A clarification apparatus for a contaminated liquid material containing heavy metals, comprising a reaction vessel including a cathode for providing a reducing atmosphere, a diaphragm, and an anode, and wherein

the diaphragm is positioned so as to surround the anode, thereby forming an anode zone inwardly of the diaphragm and forming a cathode zone outwardly of the diaphragm.

Claim 31 (Original): The clarification apparatus according to claim 30, characterized in that acid or alkali supply means for supplying an acid or an alkali to the reaction vessel is further provided.

Claim 32 (Currently Amended): The clarification apparatus according to claim 30 ~~or 31~~, characterized in that the diaphragm is unitized in a cylindrical, box-shaped or bag-shaped form composed of the diaphragm alone or a combination of the diaphragm and other reinforcement, and the anode is positioned within the unit.

Claim 33 (Currently Amended): The clarification apparatus according to claim 30 ~~any one of claims 30 to 32~~, characterized in that the cathodes are arranged in a stellate or radial configuration so as to surround the diaphragm.

Claim 34 (New): An apparatus for dissolving heavy metals from solid materials, comprising:

a vessel for containing an electrolyte solution;

at least one anode in the vessel;

at least one cathode in the vessel;

at least one diaphragm for defining an anode zone including the anode and a cathode zone including the cathode; and

a device for supplying the solid materials containing heavy metals into the cathode zone,

wherein at least a portion of each the cathode and the anode is immersed into the electrolyte solution, and the heavy metals are dissolved from the solid materials into the electrolyte solution by applying a voltage to the cathode and the anode.

Claim 35 (New): The apparatus of claim 34 wherein the solid materials containing heavy metals, water and acidic substance or alkaline substance are introduced into the cathode zone in the vessel.

Claim 36 (New): The apparatus of claim 34 wherein the vessel is a slurry formation vessel for forming a mixture in slurry including the solid materials containing heavy metals, water and acidic substance or alkaline substance.

Claim 37 (New): The apparatus of claim 34 wherein the vessel further comprises:

a slurry withdrawal port for withdrawing the slurry including at least the solid material containing heavy metals;

a slurry transferring line connected with the slurry withdrawal port; and

a pump for slurry provided on the slurry transferring line.

Claim 38 (New): The apparatus of claim 34 wherein the vessel further comprises:

a slurry withdrawal port for withdrawing the slurry including at least the solid material containing heavy metals;

a slurry transferring line connected with the slurry withdrawal port;

a solid-liquid separating apparatus connected with the slurry transferring line; and

a pump for slurry provided on the slurry transferring line.

Claim 39 (New): The apparatus of claim 34 wherein the vessel further comprises:

a stirrer for stirring slurry including at least the solid materials containing heavy metals.

Claim 40 (New): The apparatus of claim 34 wherein the anode zone is formed inside the diaphragm and the cathode zone is formed outside the diaphragm.

Claim 41 (New): The apparatus of claim 34 wherein the diaphragm is in a cylindrical, box, or bag-shaped form composed of the diaphragm alone or a combination of the diaphragm and other reinforcement, and the anode is positioned therewithin.

Claim 42 (New): The apparatus of claim 34 wherein the cathodes form a star or radial pattern to surround the diaphragm.

Claim 43 (New): The apparatus of claim 34 wherein plural cathodes are positioned in the apparatus.

Claim 44 (New): The apparatus of claim 34 wherein the vessel further comprises a shearing force suppressing means to decrease a shearing force exerted on a surface of the cathode by slurry including at least the solid material containing heavy metals, and means for providing upward-flow of slurry at a predetermined flow rate.

Claim 45 (New): The apparatus of claim 34 wherein the vessel further comprises a shearing force suppressing means to decrease a shearing force exerted on a surface of the cathode electrode by slurry including at least the solid material containing heavy metals, and means for providing upward-flow of slurry at a predetermined flow rate from the bottom to the upper portion of the vessel comprising:

a slurry withdrawal port provided on the upper portion of the vessel;

a slurry introduction port provided on the bottom portion of the vessel; and

a circulating pump for circulating the slurry from the slurry withdrawal port to the slurry introduction port

Claim 46 (New): The apparatus of claim 34 wherein the vessel further comprises a shearing force suppressing means to decrease a shearing force exerted on a surface of the cathode by slurry including at least the solid material containing heavy metals, and a flow controlling mechanism comprising one or more elements selected from a partitioning wall, a plate material, a porous material, a grid material and a network-shaped material.

Claim 47 (New): The apparatus of claim 34 wherein the vessel includes:

at least one dissolution cathode for mainly acting to dissolve the heavy metal ions; and

at least one deposition cathode for mainly acting to deposit the heavy metal ions.

Claim 48 (New): The apparatus of claim 34 wherein the vessel includes:

at least one dissolution cathode for mainly acting to dissolve the heavy metal ions; and

at least one deposition cathode for mainly acting to deposit the heavy metal ions,

wherein the deposition cathode is located at a position nearer to the anode than the dissolution cathode.

Claim 49 (New): The apparatus of claim 34 wherein the vessel includes:

at least one dissolution cathode for mainly acting to dissolve the heavy metal ions; and

at least one deposition cathode for mainly acting to deposit the heavy metal,

wherein the dissolution and the deposition cathodes are controlled to have different electrode potentials from each other.

Claim 50 (New): The apparatus of claim 34 wherein the vessel includes:

a deposition cathode of relatively high standard electrode potential; and

a dissolution cathode of relatively low standard electrode potential.

Claim 51 (New): The apparatus of claim 34 wherein the vessel includes:

a deposition cathode made of substance being relatively easy to electrodeposit heavy metals; and

a dissolution cathode made of substance being relatively hard to electrodeposit heavy metals.

Claim 52 (New): The apparatus of claim 34 wherein the device for supplying the solid materials containing heavy metals into the cathode zone is a slurry pump.